

AVIATION

SEPTEMBER 17, 1923

Issued Weekly

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Battleship Virginia Just Before Sinking

VOLUME
XV

SPECIAL FEATURES

NUMBER
12

BATTLESHIPS SUNK BY ARMY BOMBERS
COX-KLEMIN MODEL CK2 TRAINING PLANE
OFFICIAL INAUGURATION OF BOSTON AIRPORT
PROGRESS REPORT ON ST. LOUIS RACE ACTIVITIES

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y.
under Act of March 3, 1879.

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THE prime factor in the design of this type of engine is the ability to withstand the heavy duty of bombing, torpedo and long distance flying. All vital parts are particularly rugged. Hard flying at near and above rated power has thoroughly proven its durability. A generous overload capacity above rated power contributes greatly to longevity and smoothness.

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SEPTEMBER 17, 1923

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paid to exactness in every engineering detail and material specification.

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Builders of Quality Aircraft since 1909

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RICHARD H. HUNT, EDITOR

Vol. XV

SEPTEMBER 17, 1923

No. 12

More Bombing Data

WHILE the report in the War Department statement that if any important conclusions were to be learned from the "crisp practice" with the battleships New Jersey and Virginia as airplanes, they would be announced later from Washington, AVIATION will venture to draw its own conclusions.

The first fact that is clear is that two or three properly loaded airplanes along the coast are sufficient for our aerial defense from land. The flying of the squadrons of Martin Bombers from Langley Field in Maine is a very heavy load. The flying of the squadrons of Martin Bombers from Langley Field in Maine is a very heavy load. The flying of the squadrons of Martin Bombers from Langley Field in Maine is a very heavy load.

The second important conclusion reached is the efficiency of our bombs. The second torpedo will have to make a very practical demonstration to convince the public that it is as efficient a weapon as the heavy bomb. The second torpedo will have to make a very practical demonstration to convince the public that it is as efficient a weapon as the heavy bomb. The second torpedo will have to make a very practical demonstration to convince the public that it is as efficient a weapon as the heavy bomb.

The third conclusion is that of our ship's target practice. The third conclusion is that of our ship's target practice. The third conclusion is that of our ship's target practice. The third conclusion is that of our ship's target practice. The third conclusion is that of our ship's target practice.

The fourth conclusion is that developed was that a bomb of variable size, if it makes a direct hit on a portion of the deck where it can penetrate the deck armor, is certain to disable all the superstructure or render it useless. The fourth conclusion is that developed was that a bomb of variable size, if it makes a direct hit on a portion of the deck where it can penetrate the deck armor, is certain to disable all the superstructure or render it useless. The fourth conclusion is that developed was that a bomb of variable size, if it makes a direct hit on a portion of the deck where it can penetrate the deck armor, is certain to disable all the superstructure or render it useless.

The fifth point is merely a combination of the first two points demonstrated that bombs dropped close alongside a battleship do the greatest damage. It is here that the question of shipboard modern battleships becomes a question. The fifth point is merely a combination of the first two points demonstrated that bombs dropped close alongside a battleship do the greatest damage. It is here that the question of shipboard modern battleships becomes a question. The fifth point is merely a combination of the first two points demonstrated that bombs dropped close alongside a battleship do the greatest damage. It is here that the question of shipboard modern battleships becomes a question.

The subject of defense against aircraft appears to be a clear case of airplanes against airplanes. The conclusion reached from the tests is that the ship's defense is not sufficient to protect the ship from a single airplane. The subject of defense against aircraft appears to be a clear case of airplanes against airplanes. The conclusion reached from the tests is that the ship's defense is not sufficient to protect the ship from a single airplane. The subject of defense against aircraft appears to be a clear case of airplanes against airplanes.

AVIATION does not join in the extremist cry that the battleship has been doomed by the bombing tests. What has been shown, in our opinion, is that our ships need adequate aircraft protection.

The next demonstration should be against our coast fortifications, and some decision should be reached as to whether money spent on fixed big guns is not wasted in the light of modern aircraft defense.

Air Power in the Future

RARE ADMIRAL R. H. JACKSON in an address delivered recently very properly and that the ship's defense is not sufficient to protect the ship from a single airplane. RARE ADMIRAL R. H. JACKSON in an address delivered recently very properly and that the ship's defense is not sufficient to protect the ship from a single airplane. RARE ADMIRAL R. H. JACKSON in an address delivered recently very properly and that the ship's defense is not sufficient to protect the ship from a single airplane.

Looking ahead a few years, when naval development reaches a point where a nation can rely on this new force, we will find that the Commander of our Air Force is being under stress on air power as an international factor. In fact, France, today, is in a position to ignore the British Fleet and the position of the Mediterranean is a real one for Great Britain. Looking ahead a few years, when naval development reaches a point where a nation can rely on this new force, we will find that the Commander of our Air Force is being under stress on air power as an international factor.

In the future air power will have great influence on international relations, so the services of the past and present will have, but with the difference that the significance of naval power is decreasing in importance while air power will increase as it is permitted to be used.

Atlantic mainland. Consequently the Army, being charged with the protection of our coast defenses, has taken steps to provide coast defense units for this purpose. The principal base for air defense is located at Langley Field, Va., from which station the units were organized.

The Second Heavy Bombardment Group, the only one of its kind in the Army Air Service, is stationed at Langley Field. Its authorized peace strength is nine bombardment squadrons, six service squadrons (whose function is the maintenance and repair of equipment) and one photographic squadron charged with carrying out photographic missions. Although this Group has an authorized peace strength of 170 commissioned officers, 755 enlisted men, and 49 airplanes, it is actually operating with 40 officers, 515 enlisted men and 25 airplanes.

The Plane that Did It

The type of airplane used in the two-engined Martin Bomber capable of use for both day and night work. Its maximum cruising altitude is 10,000 feet. It is capable of carrying 10,000 lbs. of bombs. It has a cruising speed of 160 m.p.h. The wing span is 51 ft., its overall height is 24 ft., while its length is 60 ft. It carries 310 gal.



Plane incriminated.

The James Ford hit on the shore of the Virginia

of gasoline, 32 gal. of kerosene and 25 gal. of oil—amounted for more than 4 hr. flight at a cruising speed of 160 m.p.h. with full load, making it possible to operate at a maximum distance of 200 miles off the coast and return in the hour.

Its service ceiling or the maximum altitude that can be attained with full load, is 10,000 ft., but its heavy bombardment aircraft operates at high altitudes. It is necessary to provide a means of maintaining full motor efficiency at all times. This is accomplished by the supercharger—a device attached to the motor which maintains low level air pressure in the intake manifold of the motor at all heights. With its two three-bladed propellers with full load at a maximum altitude of 10,000 ft.

The machine gun armament consists of five Lewis guns of the latest type, providing an arc of fire to the front, side and rear, and below by means of a turret gun installed on the tail of the machine. The turret gun in 2000 lb. weight is capable of carrying 1700 lb. bombs, or seven 360 lb. bombs, or four 600 lb. bombs, or two 3100 lb. bombs, or one 2000 lb. bomb loaded in any combination desired. A wide variation of all types including demolition, fragmentation, incendiary, phosphorus, gas and smoke are available. Those used in this operation are of the 60, 100 and 2000 lb. demolition type. Previous to being used in this attack with commanders of the 1200 lb. and fourtons of the 2000 lb., these bombs were found necessary to accomplish the sinking of the ship.

The following table shows in detail the characteristics of "New Jersey"

TYPE	Weight	Speed	Range
Transportation	110,000	110 m.p.h.	1100 miles
Armament	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles
Deck	110,000	110 m.p.h.	1100 miles

In order to maintain actual wartime conditions the shipping operations operated from an emergency address, demonstrating the probability of emergency air service with a jet aircraft point. An address was selected on the coast of Cape Hatteras and was maintained by a detachment of 200 officers and fifty enlisted men with the necessary supplies and equipment in fuel and food the airplanes participating in the operation. The address is not a permanent flying field but is simply a plot of ground found suitable for the purpose. As several instances of practically any landing of our coast line will show that there are thousands of places similar

to this that could be used in the same manner. This device makes the coast flexibility and ease with which an air force can operate.

The Bombed Battleships

The "Virginia" and "New Jersey" were under attack, both being hit in 1918. Their normal displacement was approximately 16,000 tons and when fully loaded their displacement averaged 30,000 tons and more. They drew 28 ft. of water and their maximum height was 475 ft. They carried four 12 in. guns in twin turrets and twelve 5 in. guns. Ammunition they had on 11 in. armor belt, armor at other points reaching from 3 to 6 in. The armor belt was 8 ft. wide, 7 ft. of it below the water line. The cost complete of each ship was \$6,115,000.

The first attack of the day was made about 9:00 a. m. by a force consisting of six Martin bombers, each carrying over 1000 lb. demolition bombs. The personnel of this flight was as follows:

NAME	POSITION	NAME	POSITION
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer
Lawrence	Observer	Lawrence	Observer

They flew directly from Langley Field, 150 miles away, and when they reached the battleship targets they were 5:00

September 17, 1918

at 10:00. Six hundred pound bombs were dropped from between 10,000 and 11,000 ft. altitudes and the results of this bombing will make history and naval architectural history. Sixteen bombs in all were dropped, some exploding being sinking ships, as two of the explosions were "double." Four of the explosions made direct hits, two of these bombs dropped simultaneously and exploded simultaneously. These other two, two of which were double, dropped within 20 ft. of the most dangerous location for shots to reach. The percentage of direct hits of explosions makes direct hit of reaching within the danger area as about 40 per cent. The ship's back coverings has never been covered in any other form of explosion at a target practice and demonstrates clearly that our bombers can be counted on in their objectives from almost any height. It shows the weakness of battleship obsolescence, instead of usual bombs, and the loss of an attack in force, instead of a target practice of an explosion with 100 lb. shells, the "New Jersey" would have been a "quicker than the Virginia."

A second test consisted of a flight of seven Martin bombers, each carrying one 2000 lb. demolition bomb. They were on their bombs and flew from the temporary Cape Hatteras field. The personnel was as follows:

CAPTAIN HARVEY S. FLAHERTY

Captain	Harvey S. Flaaherty	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110
Observer	Lawrence	110

Bombing the New Jersey

The bombing was done at an altitude of 1000 ft. One of the first bombs was a perfect shot, dropping close alongside and exploding beneath the ship, water coming up to the gun. The remarkable fact about this was that five of the eight shots fell within 500 yds. of the stern of the ship and within an area which could almost be covered by the ship itself. This shot showed that the bomb sights were working perfectly, but that some minor correction had been required. It was also noted that some delay was caused by the bomb rack automatically opening too slowly. After this, the "New Jersey" could be seen to list to port. A hole was torn in her side—maindeck, none of the deck equipment, such as ventilators, was torn off, one being blown into the water alongside, while one of the lower hulls was torn off. A hole of 100 ft. of burned deck plate blew, opening an ugly gash directly in the rear of the stern lighting mast. Commander General Mitchell saw the "New Jersey" was sinking.

Those on board the "St. Michael" waited for an hour or more for another shot but it was not until nearly noon when the next "double" occurred. The explosion was the explosion of the sinking of the "Virginia" and the third resulted by those on board the "St. Michael" a description of the scene may be helpful. The first of ships lay about 1000 yds. off Cape Hatteras, just south of the Diamond Shoals Lightship. This part of the Atlantic is noted for its turbulent nature, but on the day of the bombing the sea was smooth, and after a steady wind with clouds of about 1000 ft. the sea was clear, so that in 30 min. the conditions were perfect for all concerned. Around the "Virginia" and the "New Jersey" was a circle of some planters and destroyers, while toward Cape Hatteras there stretched a column of destroyers for emergency aid. At the western close of the scene Martin bombers commanded by Lieutenant Crocker carrying fourteen 1200 lb. bombs, with the 500 lb. bombs. During the scene the ship was General Mitchell in the D.H.A., his personal strength on board. Five or six photographic airplanes were sent to the west to secure pictures of all the changes going on. On board the "St. Michael" were the "St. Michael" were the board of observers from the Air Service, Ordnance Department, Coast Artillery Corps and Chemical Warfare. The 20th Army Company had the Army troops 100 and 100 yds. off the shore of 1000 ft. The Secretary of War Davis, General Pershing, General Peck, Admiral Schoenmaker and General Cox and their staffs were on the bridge of the "St. Michael." As few of these on

September 17, 1918

board had witnessed the bombing of the German warships in 1917, the interest was intense.

Attack on the Virginia

As Lieutenant Crocker circled overhead at the prescribed altitude of 2000 ft. all eyes were strained to see the first 2100 lb. bomb drop on the "New Jersey." To the great surprise of everyone the first shot of the first attack of the "Virginia" was a "double." It then became evident that General Mitchell was



Plane incriminated

The New Jersey after being bombed by 600 lb. bomb.

waiting to determine whether the first bombing of the "New Jersey" would send her to the bottom. Bomb number one was released at 11:54 a. m. The second and third bombs were still off to the starboard and were again dropped to the ship. Then came the fourth bomb which will always be remembered the most startling explosion ever witnessed from an airplane. It hit the ship squarely on the stern just aft of the main mast. It seemed to go right through the protective decks and then the terrible explosion of flame and black smoke enveloped the stern of the ship. Photographs of this shot taken at the instant the explosion came the forward crew and the three main turret indicating that the shot penetrated the deck before exploding and then threw all the deck plates, turret plates and everything else in its path as air shrapnel. Then the smoke obscured the whole ship and for some time the water was white with splashes from falling debris that had been sent high in the air.

The cloud of smoke rose thousands of feet in the air and disclosed a mass of wreckage never before seen either as a battle or bombing shot. Both masts, the three masts, were gone from the stern turret and everything on the deck of the "Virginia" except the screws and the turrets were a heap of twisted steel and metal. A shudder of awe went through the minds of the observers on the "St. Michael." The Air Service officers knew that at least an aircraft launch had been sent to the complete effect of destruction in the superstructure of a battleship. The "Virginia" may be the last of its kind it may have been authorized, unannounced, without any word, as defense, but that shot has shown for all time that an 1800 lb. aircraft bomb that hits the deck of any battleship will damage the superstructure to an extent hitherto undreamed of. It should also be remembered that all ships that have thus far been bombed were without steam in their boilers and ammunition in their magazines.

About before the smoke had cleared, launch number five and six fell to port and starboard and then came a typical sinking shot. It appeared to pass the sternmost side of the

that purpose. Keep a sharp lookout for rising planes when landing and do not attempt to cross their path.

South Field, near Belleville, Ill., approximately thirty miles east of St. Louis Flying Field, is also available for landing, through the courtesy of Maj. John Poeppel, U. S. Commanding Officer. Arrangements will be made at South Field to house as many pilots as possible in the hangars there now idle. Pilots may land at South Field and fly to St. Louis Field each morning and back at evening.

Visiting pilots are requested, immediately upon arrival, to report to the Chairman of the Field Committee and be assigned

to the evening of Wednesday, Oct. 3, the Annual Banquet marks the close of the Congress. The awarding of trophies and prizes to the winning pilots who are expected to make short trips, will be a feature of the entertainment.

Tickets to the banquet and to the smoker may be obtained from Congress Headquarters by guests, as well as delivery, in the order for which they are requested as long as the supply lasts.

National Convention of N.A.A.

The Annual Convention of the National Aeronautic Association of U. S. A., Inc., will be held at St. Louis, Mo., on Oct. 30, Oct. 1, 2, 3, 1921, during the Third Army Congress. The Convention is called for the purpose of electing officers, for the evening past, according to the annual by-laws, and for the transaction of such other business as may be brought before it.

Representation in the convention shall be by states and chapters. Each chapter shall be entitled to one delegate and one alternate and one additional delegate and one additional alternate for each twenty-five members of major portion thereof from each chapter according to the records of the National Treasurer sixty days prior to the date of the annual convention.

Each state shall be entitled to one delegate and one alternate and one additional delegate and one additional alternate for each twenty-five members of major portion thereof from each state not included as chapters membership according to the records of the National Treasurer sixty days prior to the date of the National convention.

Each chapter and each state is entitled to send to the convention a number of alternates equal to the number of delegates from their organization. Such alternates shall have the right to the floor, to serve on committees and all other rights of delegates except voting. The selection of alternates to represent absent delegates is a matter for decision within the respective delegations.

The terms of office of the Board of Governors expire with the adjournment of the National Convention. The term of office of the new Board of Governors will commence immediately thereafter.

A meeting of the present Board of Governors will be held at 10 a. m., Sept. 30, 1921, at Convention Headquarters in the Hotel St. Louis, St. Louis, Mo.

A meeting of the new Board of Governors will convene within twenty-four hours after the adjournment of the national convention.

All members in good standing of the National Aeronautic Association are cordially invited to attend the sessions of the convention but will not have the right to the floor, to serve on committees or act in any way as delegates and alternates without express permission of the convention.

All delegates and alternates are urged to arrive to attend the convention; those persons who their localities interested in aeronautics and desiring of witnessing the business sessions of the convention.

Reduced rates of air and rail-fare have been granted on positively all railroads within the United States on the certificate plan. The individual, on purchasing his one-way ticket on his home train, should request of the ticket agent a certificate. If not verifiable in the records of the ticket agent, obtain from the ticket agent a receipt. These certificates or receipts should be deposited at Convention Headquarters immediately upon arrival. After validation they will be returned and upon presentation to the St. Louis ticket agent a return ticket at one-half fare may be purchased.

The above reduction is absolutely dependent upon 200 or more tickets being deposited at Convention Headquarters.

Reservations for the Hotel St. Louis, Chairman of the Hotel St. Louis, where the business sessions of the Convention, including dinner and state courses and committee sessions, will be held.

Hotel reservations will be made, as nearly as possible in accordance with the wishes of the prospective visitor, upon written request to the St. Louis Air Board, 321 Locust Street, St. Louis, Mo. Date of arrival, class of room desired, and preferred hotel should be given in the request for reservation.

Cox Klemm Model CK2 Training Plane

New Side-by-Side Training Plane Fitted with Wright E Engine
Developed for Army Air Service



Cox-Klemm model CK2 training plane, equipped with a Wright model E, 150 hp. engine

The CK2 training plane, is one of the recent productions designed and built by the Cox-Klemm Aircraft Corp., College Point, N. Y. A few of the most important features of this design are worth special mention.

A tandem seat arrangement is employed for both the pilot and student, located at all of the upper wing. This permits easy access to the cockpit and also permits leaving the cockpit with a parachute in flight, without interference with struts or wires. The seatbelts are located in the center section of the upper wing, so that both pilot and student have a clear vision of the main instruments at all times.

The fuselage is constructed entirely of metal, steel tube longbones and struts with wire bracing being used. No welding is used in its construction. The landing gear is a "tail-wheel" type, with a shock absorber mounted on the vertical strut. Side radiators are provided with shutters with controls in both the pilot's and student's cockpits.

The wing system employed is the USAAC "pusher" type, known as the "pusher" type, because the space is built-up with upper flanges, top and bottom tapering from the center section to the tips with plywood side members. Built-in spruce crossmembers, with wire bracing.

The crosshairs can be quickly assembled as there are no loose wires or adjustments to be made on the field.

Aluminum cables run through the lower wing and are attached to control slack levers by a bolt. When the wires are removed the controls are detached by simply removing the bolt and the adjustment of the wires is not disturbed. The aileron cables are attached to a T track in the wing which is connected to the aileron by a steel tube with an adjusting screw. The upper and lower ailerons are connected by an adjustable steel tube.

The stabilizer is adjustable when the machine is on the ground. The controls are of the "stick type."

SPECIFICATIONS

Length, 27 ft. 6 in.
Span, 37 ft. 6 in.
Wing area, 1,175 sq. ft.
Empty weight, 1,275 lb.
Max. weight, 1,500 lb.
Max. speed, 110 m. p. h.
Stall speed, 45 m. p. h.

Air Mail Planes at St. Louis

An honor squadron composed of ten pilots of the Air Mail Service, eight of whom made the record-breaking night flights on the recent four day test at 1,900 miles through service and two of whom stood by in reserve on that route, will fly to St. Louis in formation for the opening day of the National Air Congress, Oct. 1. The Post Office Department has either models or money for rewards, as Postmaster General Nease decided to send a corps of the Air Mail flyers to the national air meet, there to receive in the name of the nation, the prizes of the freemason or American aviation. The postal plane pilots are the invited guests of the National Aeronautic Association which is sponsoring the National Air Congress.

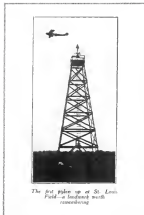
A special air mail race for a trophy provided by the Detroit News has been fixed in the program for the National Air Congress. The names of the pilots who will take part in this race will be announced at a later date.

Wright Aeronautical Earnings

The Wright Aeronautical Corp. for the quarter ended June 30, 1921, reports net earnings after taxes of \$149,303, as compared with \$41,478 for the quarter ended March 31. These returns do not include any income from the Levenston Air-Cooled Motor supplied recently by the corporation.

Fiat Purchases Ansaldo Plant

The large plant of the Ansaldo Co. at Turin, Italy, together with its equipment and supplies, has been purchased by the Fiat company. It will be used for the manufacture of heavy motors.



The first pilot up at St. Louis Field—a landmark worth remembering

hangar space or field space, in order not to interfere with regulations insisted for the proper conduct of the Races.

No change for admission to the grounds will be made to visiting pilots arriving in their planes. "Guest" automobiles allowing them the privilege of the Field will be distributed when they report to the Chairman of the Field Committee.

Aeronautic Banquet and Smoker

On the evening of Monday, Oct. 3, the Annual Aeronautic Banquet will be held in the grand ballroom of the Hotel St. Louis. Speakers of national prominence, including members of the Cabinet, former ambassadors and air attachés will be guests. Speakers at the Banquet will include: Hon. Paul Henderson, 2d Asst. Postmaster General, in charge of U. S. Air Mail Service, Hon. Sidney Weeks, Secretary of the Navy, and Hon. John W. Weeks, Secretary of War, on How Dwight Davis, Asst. Secretary of War. This Banquet and the Valedictory Ball on the evening of Tuesday, Oct. 4, will be the leading social events of the Congress.

INTERNATIONAL AIR RACES

ST. LOUIS FIELD, October 1-2-3, 1923

Don't Miss Them

\$13,300 CASH PRIZES
\$30,000 IN GOLD AND SILVER

TROPHIES

Including

Pulitzer Trophy
Liberty Engine Builders' Trophy
"On to St. Louis" Trophy

THIRD NATIONAL AERO CONGRESS

CONVENTION OF THE
NATIONAL AERONAUTIC ASSOCIATION
OF U. S. A.

AIR INSTITUTE
OF THE
AERONAUTICAL CHAMBER OF COMMERCE
OF AMERICA

Beautiful Electric Lighted Floats

and Pageant of the Veiled Prophet

AERONAUTICAL EXHIBITION OF SMALLEST, LARGEST, FASTEST AIRCRAFT IN THE WORLD

AERO ENGINES, PROPELLERS, ACCESSORIES

The fastest ARMY and NAVY and MAIL PLANES are entered in the races.

	Total Prize
1. September 30 to 30—"On to St. Louis" for St. Louis Chamber of Commerce Trophy Civilian Only	\$1,000
2. Monday, Oct. 1—Two Sevens (50 H. P. or less) for Flying Club of St. Louis Trophy Civilian Only	\$1,000
3. Monday, Oct. 1—Observation Plane for Liberty Engine Builders' Trophy Military Only	\$1,500
4. Tuesday, Oct. 2—Light Commercial Handicap (200 H. P. or less) for Aviation Country Club of Detroit Trophy Civilian Only	\$2,000
5. Tuesday, Oct. 2—Large Capacity Plane for Merchants Exchange of St. Louis Trophy Civilian and Military	\$2,000
6. Tuesday, Oct. 2—Model Race for Multi-hull Trophy Members Junior Flying League, National Aero- nautic Association	\$ 500
7. Wednesday, Oct. 3—Air Mail Plane for Detroit News Air Mail Trophy U. S. Air Mail Pilot	\$1,500
8. Wednesday, Oct. 3—High Speed Plane for Pulitzer Trophy Civilian and Military	\$4,000

Endorsed by the late President Warren G. Harding and the Secretaries of the Army and the Navy and the Postmaster General. Sanctioned by the National Aeronautic Association of the U. S. A., under the rules and Regulations of the F. A. I., and the Aeronautical Chamber of Commerce.

For full information, description of trophies, entry blanks etc. address

FLYING CLUB OF ST. LOUIS

511 Locust St.

St. Louis, Mo.

Program and Entries for St. Louis Air Meet

By RANDALL FOSTER

Chairman, Race Committee, International Air Race

In arranging the program for the 50th Louis Air Meet an effort has been made to provide phase on the program for all types of aircraft. Each of the three days assigned to the meet will have at least two main races, in which plenty of competition will be maintained. The published preliminary program and entry blank booklet contains eight major events with prizes amounting \$15,000.

All races will be flown over a triangular course 50 km (31.05 miles) around. The course lies over a terrain very favorable for racing conditions. In addition, two prizes will be placed at each race, thus cutting down the time taken on the pilots when turning the single prizes as in previous meets.

A chronologized list and description of the events, together with the list of entries received so far, follow.

Event No. 1, September 20 to 30

"O-TWO", LOUIS RACE FOR ST. LOUIS CHAMBER OF COMMERCE TROPHY FOR CIVILIAN ONLY. TOTAL PRIZES \$5,000.

This race is designed to encourage attendance at the race by air and should draw a large number and wide variety of planes to the city during the two days preceding the main races. Competing planes must be flown from a point 200 miles or more from the St. Louis Field. The winner will be determined by a system of adding points for (1) average speed based upon the total elapsed time; (2) distance around; (3) passengers carried and (4) engine horsepower. The cash

prizes will be divided among the winners of first, second, third and fourth places.

Event No. 2, Monday, Oct. 1, 11 a. m.

RACE FOR TWO SEATERS (200 hp. or less) FOR FLYING CLUB OF ST. LOUIS TROPHY, FOR CIVILIANS ONLY. TOTAL PRIZES \$200. DISTANCE 100 KM.

At the previous National Flying Meet there has been little opportunity for the many low powered two-seater ships to compete with a fair chance to win. With this in mind members of the Flying Club of St. Louis, most of whom are former pilots have presented this trophy to be completed for solely by two-seater planes of 200 hp. or less. Considerable interest has already been aroused in this event and a large entry list is expected. Cash prizes will be divided among first three places.

Event No. 3, Monday, Oct. 1, 2 p. m.

RACE FOR OBSERVATION TYPE PLANES, INSTANT 100 KM. FOR LIBERTY ENGINE BUILDERS TROPHY. TOTAL PRIZES \$1,000.

This event is designed to encourage the development of some efficient observation type airplanes and will be limited to planes flown from the Military and Naval branches. The well known trophy was donated by the manufacturers who built Liberty Motors during the war and is completed for annually.

September 15, 1933

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Event No. 4, Tuesday, Oct. 2, 11 a. m.

SHORT COMMERCIAL MONTGOMERY RACE, DISTANCE 100 KM. (300 hp. or less seating four or more passengers), FOR AVIATION COUNTRY CLUB OF DETROIT TROPHY, CIVILIANS ONLY. TOTAL PRIZES \$2,000.

In keeping with the provisions of the deal of the above trophy, which is completed for annually, this race is designed to encourage the development of light commercial aircraft. In placing points for both speed and efficiency, all entries are placed upon a more even basis. The cash prizes will be awarded as in the case of the trophy. The trophy will be awarded to the entries receiving the highest total points for both speed and efficiency.

Event No. 5, Tuesday, Oct. 2, 2 p. m.

RACE FOR LARGE CAPACITY PLANES FOR MULTINATIONAL EXCHANGE OF AIR TROPHY, DISTANCE 100 KM. CIVILIANS AND MILITARY. TOTAL PRIZES \$1,000.

This event is open to large capacity airplanes capable of carrying a payload of 2,000 lb. or over, and is designed to encourage development of large commercial aircraft, and to encourage planes for military use.

Event No. 6, Tuesday, Oct. 2, 2:20 p. m.

MODEL RACE FOR MULTINATIONAL TROPHY, MEMBERS OF FLYING LEAGUE, NATIONAL AERONAUTIC ASSOCIATION. TOTAL PRIZES \$500.

This is a duration race for model airplanes. The trophy has been presented by R. H. Hubbard, Vice-President of the National Aeronautic Association, whose desire it is to recruit large numbers of boys in building models. Already hundreds of boys throughout the country forming chapters of the Junior Flying League of the National Association.

Amateurs are building models with a desire to enter them in the event.

Entries not yet announced; others received.

Event No. 7, Wednesday, Oct. 3, 11 a. m.

RACE FOR AIR MAIL PLANES FOR DETROIT NEWS AIR MAIL TROPHY, DISTANCE 100 KM. U. S. AIR MAIL PILOTS. TOTAL PRIZES \$1,000.

This event will begin at St. Louis the last pilot of the U. S. Air Mail Service who effected the four day trials of the 30 hr. experimental flying schedule between New York and San Francisco. Great rivalry exists among these pilots and a great race is expected.

Event No. 8, Wednesday, Oct. 3, 2 p. m.

RACE FOR HIGH SPEED PLANES FOR PULITZER TROPHY, FOR CIVILIAN AND MILITARY, DISTANCE 200 KM. TOTAL PRIZES \$1,000.

The importance of the entry of the plane which won this race last year by the Army said the statement of the Navy that they are entering two new type racing planes indicates that this speed classic will be more keenly fought than ever before. Negotiations are in progress with several foreign countries and it is hoped that there will be at least one foreign entry in the race.

The international character of this speed classic will be emphasized by the entry, just received by cable by the St. Louis Air Board, of French Planes, the well known Italian test pilot of First airplanes, and holder of several world records. French Planes will be accompanied by Marie Perotti, an Italian aviator, engineer, and a pilot of state benefit. They will bring a Fiat single-engine motor equipped with a 700 hp. Fiat 12 cylinder engine, which will be entered in the Pulitzer Race, and a two-seater which they propose to enter in other events.

ENTRIES RECEIVED FOR EVENT ONE

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Holt, M. Cochran	Loarwin-Standard	Hopson "A" 150 hp	Robt. Cochran
Davis, Noah	Curtiss J-30	Curtiss C-150 hp	Darby Smith
Dutton A. McElroy	Hornet	Hopson 200 hp.	D. A. McElroy
Chas. J. Glaser	Aero Des. Engineers	Leffert 80 hp.	C. J. Glaser
Langdon E. Co.	Ferraro "Sport"	Avanca, 80 hp.	Robt. Howell
Curtiss Ea. Co.	Curtiss "Gremlin"	Curtiss OX5, 90 hp.	C. S. Jones
H. H. Warren	Own Monoplane	Own or coded	H. H. Warren
Ralph A. Northrup	Own Biplane	Curtiss OX5, 90 hp.	R. A. Northrup
Huff Daland Corp.	Pittet Model 4	Hopson Model 4	Geo. S. Post

ENTRIES RECEIVED FOR EVENT TWO

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Curtiss Ea. Co.	Curtiss "Gremlin"	Curtiss OX5, 90 hp.	C. S. Jones
Langdon E. Co.	Ferraro "Sport"	Avanca, 80 hp.	Robt. P. Hewitt

ENTRIES RECEIVED FOR EVENT THREE

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Army (U. S. A. C.)	Curtiss 107	Curtiss CH15, 400 hp.	Ens. D. C. Allen
" "	V-30	Wright-Leavens, 210 hp.	2nd Lt. G. R. Hall
" "	DH-10	Liberty, 400 hp.	Maj. R. S. Brown
" "	" "	" "	2nd Lt. J. J. O'Connell
" "	" "	" "	" " W. E. Brookley
" "	" "	" "	" " D. M. Debus
" "	" "	" "	" " H. R. Lacey
" "	Albion	Wright, 300 hp.	" " W. T. Lawrence
" "	" "	" "	" " J. Wiley
" "	C-24	Liberty, 400 hp.	" " W. H. Brookley
" "	C-25	" "	Capt. R. Cohen
" "	LePere	" "	1st Lt. L. H. Smith
" "	" "	" "	" " D. M. Connell

ENTRIES RECEIVED FOR EVENT FOUR

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Curtiss Ea. Co.	Curtiss OX5, 90 hp.	Curtiss OX5, 90 hp.	C. S. Jones
Huff Daland Air Corp.	Pittet Model 4	Hopson E, 150 hp.	Geo. S. Post

ENTRIES RECEIVED FOR EVENT FIVE

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Army	DT-4	Wright T5, 500 hp.	Ed M. A. Baker
" "	Marine Bomber	2 Liberty 400 hp.	Ens. W. E. K. Reber
" "	" "	" " 400 hp.	Capt. C. C. Frank
" "	" "	" " 400 hp.	1st Lt. L. Wade
" "	" "	" " 400 hp.	" " L. P. Arnold
" "	" "	" " 400 hp.	" " H. L. Werners
" "	T-2	Liberty 400 hp.	" " H. O. Crocker
" "	DH-1	W 700 hp.	" " M. S. Fureldahl

ENTRIES RECEIVED FOR EVENT SIX

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Army (USMC)	Wright TX	Wright T5 700 hp.	1st Lt. W. Callaway
" "	Wright YX	" "	1st Lt. L. H. Sanderson
" "	Curtiss EX-1	Curtiss CH15 400 hp.	Ens. A. J. Whitman
" "	Verville Spray	" "	1st Lt. A. Pearson
" "	Army Curtiss Racer	" "	" " J. D. Corbitt
" "	" "	" "	" " W. Miller

ENTRIES RECEIVED FOR EVENT SEVEN "A"

Name of Entrant	Make and Type of Plane	Make and Type of Motor	Name of Pilot
Thomson-Morse M-12	Thomson-Morse M-12	Wright 300 hp.	1st Lt. T. W. Blackburn
" "	" "	" "	" " R. C. Matthews
" "	" "	" "	" " P. Treadwell
" "	" "	" "	" " E. D. Meredith
" "	" "	" "	" " J. T. Johnson



How to fly to the International Air Race, Oct. 1-3.—Map prepared by the Airways Section, A.S. showing the most suitable airway leading to St. Louis.

The expected entry of L. L. Carter, with an English Glider race, which was believed to be a paid race of American, unfortunately has not materialized, as his ship apparently cannot be loaded in time to qualify under the low speed requirements of the Pulitzer Race.

Event No. 8A, Wednesday, Oct. 3

RACE FOR ARMY AIR SERVICE PILOTS OF FIRST PURSUIT GROUP FOR THE MITCHELL TROPHY

The John L. Mitchell Trophy, said to have been completed for this race by members of the First Pursuit Group, and will serve as a stimulating race of Army pilots flying standard service equipment.

Aerodynamic Plane Table

NACA Report No. 166
By A. F. ZAHM

For the accurate and expedient geometrical measurement of models in an aerodynamic laboratory, and for small-model transport operations, there is frequent need for a specially equipped plane table. The example, one may have to measure body to 0.001 in the effects of an air jet of velocity up to 100 ft. per sec. Or the effects of a wind, which may be in other respects, toward speed, may require only a few ft. per sec. A portable airplane model may have to be adjusted for correct incidence at all parts of its surface, or verified in these parts for correspondence in specifications. Such work, if not occasional, may be done on a portable or folding machine. And, if frequent, justify the provision of a special table. For this reason, if this issue described in 1915 is under the table, devoted to this report and to equip it with such parts and measures as the user should require.

A copy of Report No. 166 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

U. S. Civil Service Examination

The United States Civil Service Commission announces an open competitive examination for the position of Junior Aeronautical Engineer to \$3 a unit in the Bureau of Aeronautics, Navy Department, at an entrance salary of \$4,800 a year, plus the surplus of a month's salary as entrance pay. Those desiring to take the examination will be held throughout the country on Oct. 37.

The duties are to assist in the conduct of experimental and research tests, perform calculations, design apparatus, compile reports, or otherwise assist in the work of a research laboratory devoted to the study of aeronautics problems, and other related work.

Competitors will be asked on the subjects of general physics, mathematics through calculus, practical questions on aeronautics engineering, and electricity, training, and experience. Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examination at the post office of customhouse in any city.

Longitudinal Oscillation of a VE7 Airplane

NACA Report No. 182

This investigation was carried out by F. E. Norton and W. G. Brown, National Advisory Committee for Aeronautics, at Langley Field in order to study as closely as possible the behavior of an airplane when it was making a longitudinal oscillation. The purpose, the objective, the angle with the horizontal and the angle of attack were all recorded simultaneously and the resulting curves plotted in the same time scale. The results show that all the curves are very close to a single curve, with the curves for height and angle of attack in phase, that for angle with the horizon leading them by 12 per cent and that for pitch angle leading them by 26 per cent.

AIRPORTS AND AIRWAYS

The Department is concerned with all civil flying activities such as the establishment of airports, the making of surveys, securing to airports existing structures, equipment, published air flying orders and landing fields, the work of commercial aviation companies and private firms, the formation of new air transport enterprises, personal paragraphs of general interest, etc.

Chicago News

Months of work which meant Chicago flying fields across the city were in August closed most of the time to aviation. The Chicago Fair, opposite Wabash's field, as well as the Cook County Fair at Pullman, were so poorly attended during the week and Sunday that hardly any flying business could be expected from that source.

It was the only busy day in being a crowd. Much low-level work was done in the morning and evening, as in the past, around by a large crowd of people. The Fair, at the Cook County Fair, was kept as busy as ever. The Chicago Fair, at the Cook County Fair, was kept as busy as ever. The Chicago Fair, at the Cook County Fair, was kept as busy as ever. The Chicago Fair, at the Cook County Fair, was kept as busy as ever.

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Communication in the field, addressed "Airways Editor, Aviation, 235 Fourth Ave., New York City," should be sent, or made, at the point. They should deal with facts, not with theories or speculations. While Airways and Flying activities will naturally be given precedence, communications will also be welcomed from Canada, Mexico and other parts of the Western Hemisphere. Editors.

Boeing Delivers Pursuit Plane to McCook Field

The Boeing Airplane Co. of Seattle, recently delivered to the Air Service at McCook Field a biplane pursuit airplane built from their own design and in accordance with Air Service specifications. This pursuit plane is a biplane, powered by a Curtiss D-12 engine. It has a single, fully loaded, of 207 hp, a span of 32 ft. and an overall length of 22 ft. 16 in. Mr. E. J. Kephart, Chief Engineer of the Boeing Co., will remain at McCook Field until the official performance tests of this plane are completed.

The Boeing Airplane Co. has successfully constructed 200 Thomas-Morse M2A3 pursuit airplanes, and its GAI model attack airplanes and pursuit 30 D-12s. This recently delivered the second of two GAI airplanes, an armed biplane powered with an 800-hp GAI engine (McCook Field Engineering Division), and has completed these D-12A3 engines, the first of which will be the first of the GAI with the exception that the fuselage is of tubular steel construction.

Richards Field, Kansas City

Commercial activities at Richards Field, Kansas City, Mo., during the month of July have been very good with about the usual number of transient ships through. The ships operating locally report a large number of cross country trips and the second of two GAI airplanes, an armed biplane powered with an 800-hp GAI engine (McCook Field Engineering Division), and has completed these D-12A3 engines, the first of which will be the first of the GAI with the exception that the fuselage is of tubular steel construction.

The Air Service has some plans for increased activities at the field, but these will be those planned by the Air Technical Association will soon carry out of the construction of aerial work at Richards Field.

German-Cuban Air Line

According to French reports, the German-Cuban air line which was proposed to establish a passenger and service from Havana to Buenos Aires, Argentina, using Junkers D-10 monoplanes, has had bad luck in its enterprise.

It was the intention of the German plane of the air line from last spring from Havana to Port-au-Prince, Haiti, and thence across the Caribbean Sea to La Guayra, Venezuela. Nothing more was heard of these ships, but it is now reported that after a long delay the vessel Brazil in April, 1933, cent of them was crushed on landing near Bolon (Haiti), while the other machine caught fire while lying in the city of Cienfuegos and crashed killing both pilot and mechanic.

Gallaudet Daylight Bomber

Recently, the second D-11 airplane (Daylight Bomber), constructed by the Gallaudet Aircraft Corp., was given its first flight at McCook Field. This bomber is a large monoplane with a span of 66 ft. 4 in., length of 42 ft. and weight of 5600 lb., fully loaded. It is powered by McCook Field Engineering Division, 15-cyl model W-1A engine, and is of metal construction, never before used in a bomber.

The first airplane of this model constructed by the Gallaudet Corp. was almost entirely of metal construction, the workmanship being exceptionally fine.

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OCTOBER 1-8-15-22

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AT ST. LOUIS, OCTOBER 1-2-3

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Announcement Number, October 1

Description and photographs of the planes entered in the coming races. Stories and photographs of the pilots and officials in, as well as individuals prominent in aeronautical circles at events, also early airplanes and everything of special interest in advance of the meet.

Race News Number, October 8

Expert account stories on the results with photographs of the winning machines and pilots at the field and numerous timely photo and articles.

Technical Number, October 15

Everything of special technical interest in regard to the planes, engines and equipment, with photographs and drawings of special features in such, as well as comments on and lessons of the Meet, all written by recognized authorities.

Air Convention Number, October 22

Full and accurate reports, in text and pictures, of sessions of the International Aero Congress, the important addresses and the proceedings on the floor of the Annual Convention of the National Aeronautics Association which will elect officers and lay down a program for the coming year.

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You may send in the address below extra copies in advance before the issue of AVIATION containing: () October 1 () October 8 () October 15 () October 22. Remittance at 15c per copy is required.

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